THE ACCIDENTAL TRADER GAME

R&R Consulting

2007

http://atg.creditspectrum.com

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Introduction

The Accidental Trader Game is an educational tool designed to simulate the real-life experience of a risk officer managing the credit risks of a large portfolio of corporate bond or loan exposures.

Delegates have an opportunity to manage a large portfolio undergoing multi-period credit challenges by adopting various credit risk management strategies to keep the portfolio probability of default [Pd] at a pre-determined value, which the game administrator has set using a corresponding Value at Risk (VaR) level. In addition, the team's portfolio default probability must not exceed a given, critical level no matter what else is going on. If this level is breached, the game considers that the manager, or team of managers, has lost the ability to control the portfolio. That outcome corresponds in practice to economic loss for the firm and probable job loss for the manager. The game ends after a certain number of time periods, usually twelve, or when each team but the last - the winning team - is out of business. If more than one team survives, the team with the best Pd record is declared the winner [statistic factor], while other teams are ranked by their longevity in the game [stochastic factor].

At the beginning of the game, each team is provided with an initial portfolio of risky exposures. All exposures are assigned a credit rating reflecting its ex-ante probability of default. Associated with each risky exposure, is a set of financial characteristics commonly used as input variables in credit risk modeling and management, such as the recovery rate, loan-equivalent exposure and credit-default swap [CDS] spread. Those characteristics change with the passage of time and trigger various credit events such as upgrades, downgrades and defaults, which are reported at the beginning of each time step or "round". So are key portfolio-level parametric averages: portfolio mean loss, portfolio loss standard deviation, and VaR to help managers in forming risk judgments and making tactical portfolio adjustments.

At the beginning of each time step, teams borrow short-term funds from the market or one another in order to keep the portfolio probability of default at the target level. Teams can improve their performance through various risk-management tactics. They can swap out of risky exposures for anti-correlated equivalents to reduce portfolio sensitivity to extreme events, or buy or sell CDS contracts on their portfolio exposures. By doing so, teams can realize gains or losses as well as increase or decrease their exposure to the market.

Main Elements of the Game

Portfolio

Portfolio is the most general and most important concept in the game. After all, managing risks of a portfolio as a whole is the main goal of a risk manager. The portfolio consists of the set of N risky exposures, whereby N is arbitrary. Each exposure taken alone does not carry much information for the risk manager. However, taken together they determine the values of the main portfolio characteristics.

Exposure

Even though a single exposure does not reflect much of the characteristics of a large portfolio, it is still useful to know information about individual risks. Usually, a risk manager will be interested in monitoring the most risky components of the portfolio. Therefore, the game gives participants the ability to review individual exposures and take actions, like trading and buying or selling protection. This is how a manager can bring the whole portfolio to a desired risk level.

The game provides the following parameters, displayed on the exposure screen, portfolio table or both:

- *Name.* Every exposure is assigned a unique identifier and a name. The exposure's name doesn't carry any useful information and serves only to identify single loans in a more realistic context. Thus, the fact that an exposure is called "Microsoft" does not mean that it should have a high rating and therefore, a low probability of default.
- *Rating.* A Moody's letter-grade rating is assigned to each exposure. The rating is based on the probability of default. The lower the probability of default for a certain exposure, the higher the credit rating. Ratings can change from one time step to another as a result of natural exposure evolution, as well as from random world events. Participant can observe current and previous ratings at any given time step.
- *Probability of default.* One of the most important exposure characteristics. It is used to compute the likelihood that an exposure will default, its credit rating and its CDS spread. It also changes naturally as time passes based on the behavior of an arbitrary driving function y(t) and sometimes randomly jumps up or down as a result of world events generated by the system [a Levi-jump process]. Historical data describing probability of default x(t) and the driving function y(t) are displayed on the exposure screen as well.
- *Loan Equivalent Exposure (LEE).* This variable shows the dollar amount invested in each exposure. For the sake of simplicity, LEE is assumed to be constant

across all portfolio exposures. The LEE amount influences the loss/profit profile in case of credit events, as well as CDS premia received or paid.

- *Loss Given Default (LGD).* The percentage of LEE which will be lost if the corresponding exposure defaults. LGD is used to compute expected losses, VaR, and the consequence to the holder of the exposure, or CDS seller, when default occurs.
- *CDS Spread.* Annual premium received or paid for protection on any given exposure. The more risky the exposure, the higher its CDS spread. The spread changes with time depending on the exposure's system-computed probability of default to reflect market conditions. For the sake of simplicity, we assume that the bid/ask spread is zero.

As a result of a credit event or a natural evolution every exposure can default. Defaulted exposures stay in the original holder's portfolio but are no longer used to compute risk characteristics. It is also not possible to trade an exposure after it has defaulted, buy and sell protection on it or do any other operation available with respect to the non-defaulted exposures. The loss in the event of default is added to the "Total Realized Losses" account and displayed in real time on the team's main screen.

Ratings

Letter-grade ratings are directly connected to the exposure's probability of default, which itself varies naturally with time. The rating table can be accessed from the main screen (more on this in the user interface section below). Ratings are presented for informational purposes only. All computations use actual default probabilities. However, letter-grade ratings are easier to monitor and interpret for most market participants.

Trading

Every exposure in the portfolio can be traded. Every month a certain number of possible trading candidates will be available to all teams. These choices consist of exposures anti-correlated to the portfolio as a whole. There is a small transaction cost involved in trading, but in general it does benefit the risk manager to replace a highly risky exposure with an anti-correlated one because, as a result of this transaction, VaR will decrease. As a result, the amount of required risk capital will be lower. Consequently, less short-term capital will be needed and lower interest payments will be made to those who provide such capital, thus decreasing the total cost of risk management. If a manager has bought or sold protection on the traded exposure, the said CDS contract will be automatically terminated upon trade execution.

Buying and Selling Protection

Every participant can buy or sell protection on any exposure in the portfolio. Buying protection will attract a known premium every month based on the annual CDS spread for the target exposure. The notional amount of protection purchased or sold is selected as an arbitrary percentage of the exposure's loan-equivalent exposure. Therefore, to

fully protect an exposure, a notional amount equal to LGD should be purchased. On the other hand, any amount of CDS notional can be purchased. If the exposure defaults, the protection buyer will receive the corresponding LEE amount and the CDS contract will be terminated.

Protection can also be sold on the open market. However, the amount of protection which can be sold is limited by market interest. As a result of selling protection via a CDS contract, the seller will collect monthly premiums but will have higher expected losses, which will increase the selling team's capital requirements. If a credit event occurs and the target exposure defaults, the seller will have to pay the amount corresponding to the notional amount of the CDS contract. At that moment, the seller collects the last premium payment and the CDS contract is automatically terminated.

Participants can terminate any CDS contract by entering into an offsetting contract with identical terms. In that case, a termination value will be computed as of the current time step, resulting in a profit or a loss on the position.

Main State and Control Variables

Capital

The total amount of your capital directly linked with the default probability of your portfolio. Therefore, it is very important to have sufficient capital to cover your credit risk. The total risk capital you have available consists of two parts: Long Term Capital and Short Term Capital.

Long Term Capital [LTC]

Before you start a new, twelve-round session, you will have to decide how much Long Term capital you want to rent. This amount cannot be higher than the portfolio's VaR at the beginning and will stay constant during the entire session. The interest rate on Long Term capital is much lower than that on Short Term Capital. Therefore, it might make sense to rent as much Long Term capital as you think you might need to cover your VaR during the game. However, renting too much LTC at the beginning of a session can result if less flexibility during the session, because you cannot adjust this capital during the session, which is why it's called "long-term". If this amount is greater then the current VaR requirement, you will not be able to adjust total capital in an effort to bring your probability of default to the desired level. In that case, you will be wasting capital. Of course, you can rent someone else's capital if you think that may help, although doing so will tend to be expensive since your rental cost will depend on your previous default probability. The idea is not to have too much or too little capital, but just the right amount.

Short Term Capital [STC]

Short Term capital is available for rent at the beginning of every month and it is always rented for a one-month term. Thus, any amount of Short Term capital you have rented for the previous time step will be given back to the lender at the end of the month. This form of capital gives participants the flexibility to address the current risk-situation in the portfolio and adjust total capital as mentioned above.

Renting Capital

At the beginning of each session, participants will decide how much Long Term capital to secure. After that, only Short Term capital will be rented. There are two ways to rent it. First, any amount of STC can be rented directly from the market at a given, floating interest rate. Second, it can be rented from other participants. In that case, the interest rate will be lower than the market rate. However, the renting team will have no effective control over how much capital is available for rent. The system will determine the amount of excess capital, if any, available to the lending team and then will transfer this excess amount to the renting team's account. To enter into rental agreements, teams can communicate with each other using their Skype account. Each team needs a Skype account and a pair of earphones.

User Interface

How to Join the Game

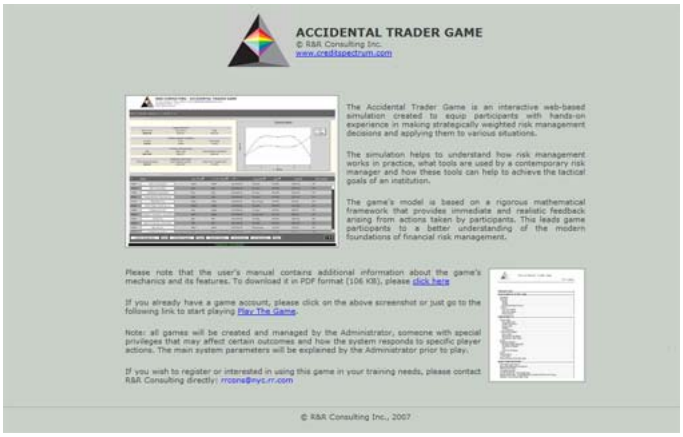
In order to join the game, you will need to have a password, enabling you to access the game server. The password will usually be provided by the game administrator. After logging into the server, teams will be able to register their name with the system. Below are detailed instructions on the registration step. Each name needs to select a unique team-identifier.

Game's Web Page

First step is to visit our web site at:
http://atg.creditspectrum.com

The web site contains summary information about the game, as well as a user manual available for download.

Click on the game screen-shot or on the link "**Play The Game**" to go directly to the game server.



Server Login

Connect to atg.creditspectrum.net
The server atg.creditspectrum.net at R&R CONSULTING - SECURITY ACCESS requires a username and password.
Warning: This server is requesting that your username and password be sent in an insecure manner (basic authentication without a secure connection).
User name:
student
Password:
Remember my password
OK
Cancel

Now, you will need a log-in name and a password to login to the server. This information will be provided to you by the game administrator.

This process will let you log in to the server not to the particular game. Usually, all participants will have the same name and password at this step.

After logging into the server, each team will have an ability to choose which game to play, register itself, continue playing a previous game, etc.

Join the Game

If you have registered your team before, now is the time to join one of the new games. Type your team's name, password, and choose a game from the drop down box.

Ask the administrator which game was created for you. If the name of this game does not appear on the list, please click the "refresh games list" button below. Once ready, press the "submit" button.

Creating New Account

If you haven't registered your team yet, click on the "Click here to register" link. The registration form will come up. Please, provide all required information, including Skype id, which is important for you and other teams to be able communicate during the game.

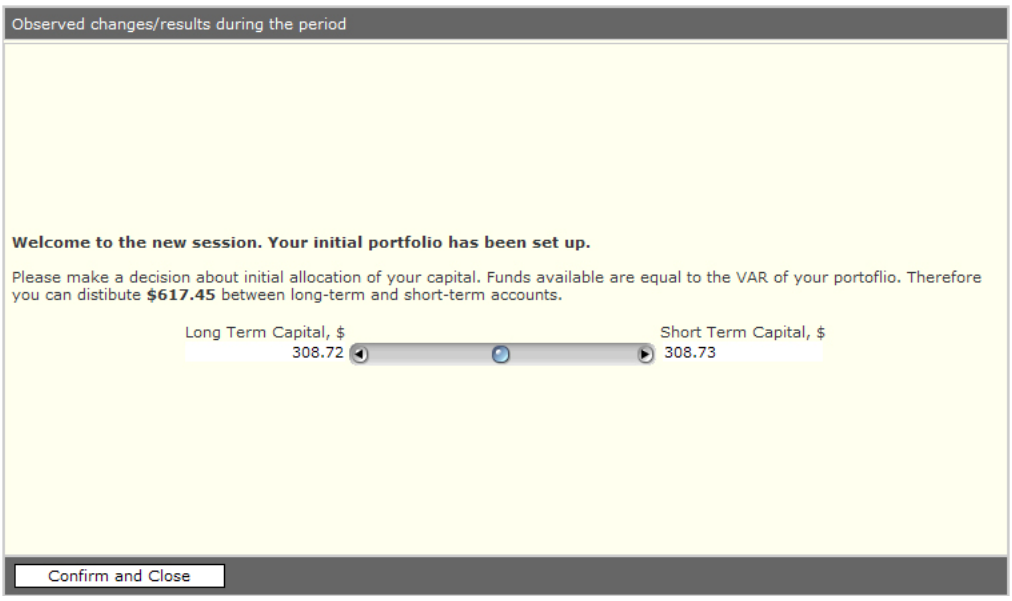
After that, click on the "register" button. A confirmation screen will be displayed. Now, your team can join any new game from the log in screen.

Re-Joining the Last Game

The first item in the "game" drop-down box will be "[last game]". Players should choose this item if they wish to continue playing the previous game they were playing, and stopped playing for some reason. If that game is still running you can easily join back and start right from the place you stopped. This feature is useful in case the team's web browser or computer had to be rebooted, or if the game was postponed for a period of time, such as lunch.

Initial Capital Setup

Before beginning any new session, participating teams will be asked to set up their capital structure. As mentioned above, this will consist of two parts: Long Term- and Short Term Capital. The capital setup screen is shown below:


Observed changes/results during the period
Welcome to the new session. Your initial portfolio has been set up.
Please make a decision about initial allocation of your capital. Funds available are equal to the VAR of your portoflio. Therefore you can distibute $617.45 between long-term and short-term accounts.
Long Term Capital, $
308.72
Short Term Capital, $
308.73
Confirm and Close

The maximum total capital available at the outset is equal to your portfolio's current VaR. This amount should be divided between Long Term- and Short Term capital. Remember that the amount of Long Term Capital you choose remains constant during the session. As a general rule of thumb, it is reasonable to dedicate about 80% of total capital to Long Term capital and to rent the rest as the game proceeds. However, depending on a strategy a team chooses, this could be an under- or overestimate.

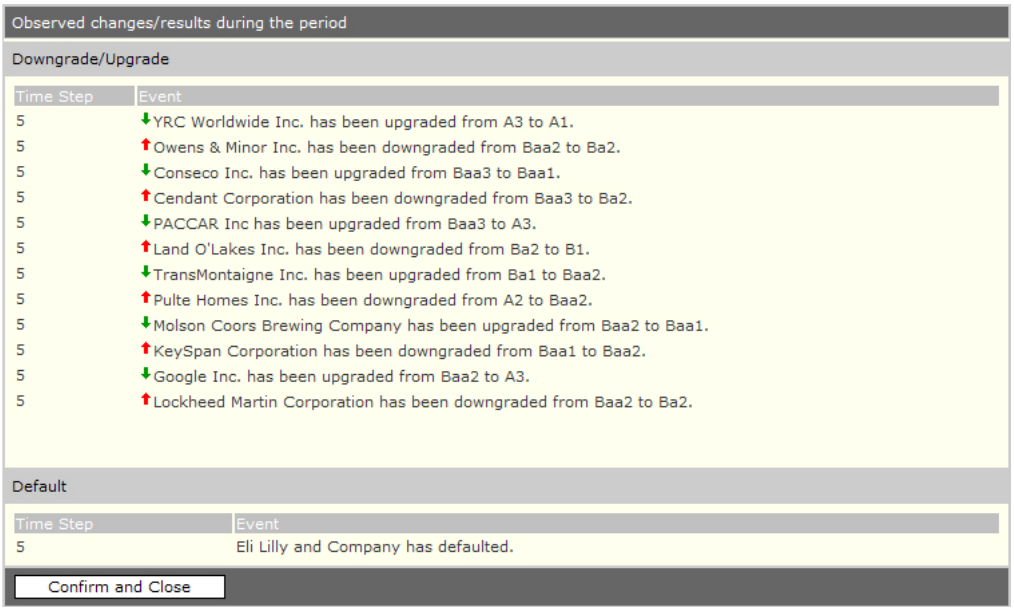
After your capital structure has been set, press the "Confirm and Close" button. The system will wait until all teams have made their decision about the initial capital structure before proceeding to the next time step. Therefore, setting up the initial capital structure is the only required task during the first month of any session.

Main Screen

Now, let's look at the main screen which will be used by playing teams to obtain current information and make their decisions. Before we proceed to the description of information and controls however, we need to say a few words about the sub-section of the main screen called "World Events".

World Events

At the beginning of each time step, all teams will see this type of screen:


Observed changes/results during the period
Downgrade/Upgrade
Time Step
Event
5 YRC Worldwide Inc. has been upgraded from A3 to A1.
5 Owens & Minor Inc. has been downgraded from Baa2 to Ba2.
5 Conseco Inc. has been upgraded from Baa3 to Baa1.
5 Cendant Corporation has been downgraded from Baa3 to Ba2.
5 PACCAR Inc has been upgraded from Baa3 to A3.
5 Land O'Lakes Inc. has been downgraded from Ba2 to B1.
5 TransMontaigne Inc. has been upgraded from Ba1 to Baa2.
5 Pulte Homes Inc. has been downgraded from A2 to Baa2.
5 Molson Coors Brewing Company has been upgraded from Baa2 to Baa1.
5 KeySpan Corporation has been downgraded from Baa1 to Baa2.
5 Google Inc. has been upgraded from Baa2 to A3.
5 Lockheed Martin Corporation has been downgraded from Baa2 to Ba2.
Default
Time Step
Event
5 Eli Lilly and Company has defaulted.
Confirm and Close

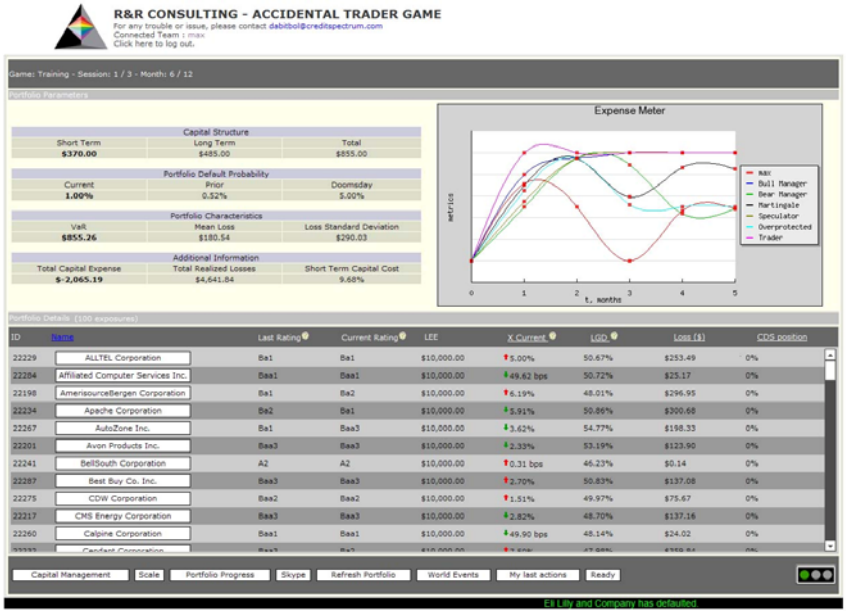
It informs players about what happened in the game's world during the past month. The top part of the screen shows upgrades and downgrades. Upgrades are indicated by green, down-arrow symbols. The direction of the arrow means that the probability of default went down, hence the green (improvement) color. On the other hand, when an exposure's default probability went up, a red (deterioration) arrow is displayed. Participants will also be able to see the name of each upgraded/downgraded exposure and how its letter-grade credit rating has changed.

The screen section beneath "upgrades and downgrades" shows defaults that occurred during previous time steps. Defaults usually don't happen often; hence, it is very likely for no default to have occurred during any given month. However, there can be time steps where a few defaults will occur in a single month.

Once a player presses the "Confirm and Close" button, this informational screen disappears and the main control screen becomes fully functional.

Main Screen Overview

Here is a typical main screen display. It consists of several areas which we describe in detail below. In general, the most valuable information to a risk manager is displayed in the table in the top left corner. Here, a player can monitor important benchmarks associated with his or her current portfolio.



On the right of the table, a graph labeled “Expense Meter” is displayed. It shows the comparative performance of all teams playing a given game. As is implied by the graph’s label, the lower a team is positioned on the graph, the better it is currently performing. Players can see all historical changes from the beginning of the session (time 0) until the current time step.

The large section underneath the graph and the parametric table shows the team’s current portfolio. Participants will see all exposures in the portfolio as well as their main characteristics (see above). To obtain more detailed information about particular exposures, you need to click on its name. For a description of the exposure screen, please see the corresponding section below.

Finally, at the bottom of the main screen, a series of control buttons are displayed. They all have different informational or operational purposes and are described in details below.

Game Information

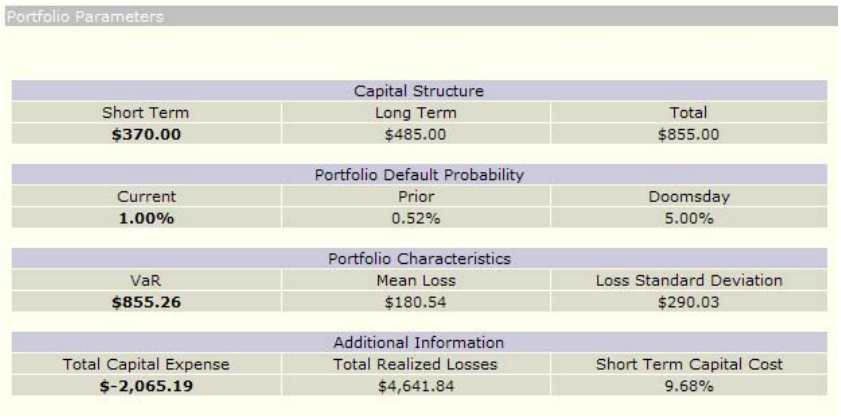
The top part of the main screen shows general game information. Here, you can find contact information in case of technical issues, the name of connected team and of the current game, the current session and the current time step.

R&R CONSULTING - ACCIDENTAL TRADER GAME
For any trouble or issue, please contact dabitbol@creditspectrum.com
Connected Team : max
Click here to log out.
Game: Training - Session: 1 / 3 - Month: 6 / 12

A game will normally consist of three sessions. In the example above, Session Number 1 of a three-session game is now in progress. The same logic applies to the "Month" indicator, i.e. there are twelve months in the session and we are now playing Month 6.

Portfolio Parameters

This is the most informative section of the user screen since it displays the main portfolio parameters. The most important ones are shown in bold font.

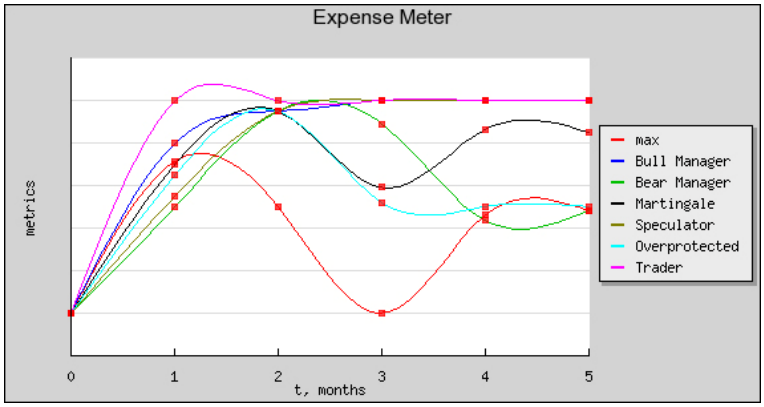


For instance, the amount of Short Term Capital rented during the current month is displayed below the label "Short Term". As mentioned above, STC and LTC taken together determine the portfolio's current probability of default. Thus, in the picture screen, the total amount of capital available is $855.00 while current VaR is $855.26. This computes to a current probability of default of 1%, which is the set point for the game. Also, a team can monitor its prior probability of default as well as the critical portfolio-default probability beyond which it is expelled from the game. In other words, if a team's default probability rises above this level at any time during the game, it will be expelled until the end of the session and will be allocated the highest expense level.

The next line shows Value at Risk (VaR), mean portfolio loss, and portfolio loss standard deviation. These statistical measures are used to evaluate the credit risk in the portfolio and derive its probability of default.

The final row in the table displays the Total Capital Expense – one of the parameters used to determine a team's score. Expense can be positive or negative. A negative expense means that profits were realized as a result of risk management. Portfolio expenses include trading costs, any CDS premia paid and received, interest on rented capital, and interest received from renting a team's excess available capital to other teams.

Expense Meter



This graph shows the relative performance of all teams playing a game. Depending on actions taken by every team and due to a series of random world-events, the Expense Meter for each team will be associated with different values as time progresses. The Expense value is cumulative, therefore only the last value is used when computing the final score.

The graph's purpose is to give team members an idea of how they are doing during the session. Based on this information, a team can decide which actions, if any, to take in order to increase its risk management efficiency.

Portfolio

The portfolio is represented via the exposure table. Each exposure is displayed on a single row in the table. Exposures can be sorted by Name, Probability of Default [x], LGD, Loss, and associated CDS position. To sort the table, simply click on the corresponding label. When the same label is clicked a second time, the sorting order toggles between ascending and descending.

ID
Name
Last Rating
Current Rating
LEE
X Current
LGD
Loss ($)
CDS position
22229 ALLTEL Corporation Ba1 Ba1 $10,000.00 5.00% 50.67% $253.49 0%
22284 Affiliated Computer Services Inc. Baa1 Baa1 $10,000.00 49.62 bps 50.72% $25.17 0%
22198 AmerisourceBergen Corporation Ba1 Ba2 $10,000.00 6.19% 48.01% $296.95 0%
22234 Apache Corporation Ba2 Ba1 $10,000.00 5.91% 50.86% $300.68 0%
22267 AutoZone Inc. Ba1 Baa3 $10,000.00 3.62% 54.77% $196.33 0%
22201 Avon Products Inc. Baa2 Baa3 $10,000.00 2.33% 53.19% $123.90 0%
22241 BellSouth Corporation A2 A2 $10,000.00 0.31 bps 46.23% $0.14 0%
22287 Best Buy Co. Inc. Baa3 Baa3 $10,000.00 2.70% 50.83% $137.08 0%
22275 CDW Corporation Baa2 Baa2 $10,000.00 1.51% 49.97% $75.67 0%
22217 CMS Energy Corporation Baa3 Baa3 $10,000.00 2.82% 48.70% $137.16 0%
22260 Calpine Corporation Ba1 Ba1 $10,000.00 49.90 bps 48.14% $24.02 0%

Sorting the table is convenient in cases where, for example, participants want to see the exposures with the highest default probabilities or else their current CDS position on said exposures. As the default probability [x] changes over time, the corresponding arrow will be shown next to the x value. These arrows work the same way as those on the downgrade and upgrade screen mentioned earlier, i.e. when the default probability goes down, the arrow is green; when it goes up, it is red.

Control Buttons

The set of control buttons at the bottom of the user screen allows the team to perform various actions and to obtain useful feedback-information. The “Capital Management” button brings up the screen where Short Term Capital can be rented from the market, as well as traded with other teams. The “Scale” button provides the relationship scale between probability of default and letter-grade credit rating. “Portfolio Progress” shows the prior evolution of various portfolio characteristics.

The “Skype” button has Skype IDs of all playing teams and helps to establish communication between them. The “Refresh Portfolio” button is included to help players with older versions of web browsers. If you believe that your portfolio table does not reflect the real picture (for example just traded exposure is not in the portfolio), please press this button and the latest information will be retrieved from the database.

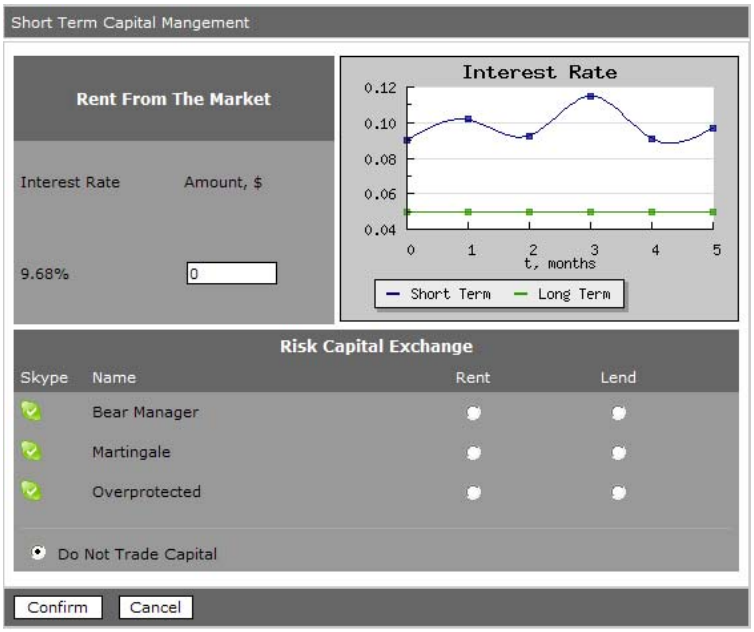
The “World Events” button provides the log of all events that occurred during the current session. The log file contains all upgrades and downgrades, as well as all defaults with corresponding time step.

The “My Last Actions” button displays a history of all prior actions taking by a playing team. These actions are recorded with their corresponding time step and other meaningful information. Sometimes, it can be helpful for players to see which actions have been taken as a guide to a better risk management strategy.

The “Ready” button, when pressed, lets the system know that a team has made all its current decisions and is ready to proceed to the next time step. After a team presses this button, changes to any parameter can only be made at the next time step.

In connection with this button, it is crucial not to forget to rent Short Term Capital at every time step. Also, please note that the system will prompt each team if the amount of its requested Short Term Capital is zero. At that moment, the team can decide to change it or else proceed if this value is a conscious part of its current risk management strategy, i.e. to rent zero Short Term Capital during the next time step. This maneuver should only be done carefully.

Capital Management



Using this screen participant can mange Short Term capital.

The small graph on the right hand side shows interest rates. The green line indicates Long Term Capital interest rate, which is constant over the course of the game.

The blue line represents Short Term Capital interest rate, which changes from one time step to another.

Any player can communicate with other players using the Skype buttons placed in front of team names in the table below.

As mentioned before, there are two ways to obtain Short Term Capital, i.e. from the market and from other teams. We will now look at both ways a little closer.

Interest Rates

As you can see on the graph the Short Term Capital interest rate changes over time. It's always higher than the long term rate and intimately tied to the team's portfolio default probability. Normally, when a team's default probability rises, this rate will increase and conversely, when the default probability decreases, the rate decreases.

Long Term capital is a much cheaper source of capital. However, it lacks the flexibility provided by Short Term Capital. Therefore, it is a good idea to wisely allocate an optimal amount of Long Term Capital at the beginning of every session. Participants should be careful when making a decision about this allocation. For instance, allocating too much Long Term Capital can lock in a team's total capital amount at a relatively high level, and hence prevent the portfolio's probability of default from being maintained at the desired level. This means that the portfolio default probability will be too low even with zero Short Term Capital allocation. Conversely, allocating too little may lead to a higher total cost of capital, and therefore, to abnormally high total capital expenses.

Renting from the Market

The first and most convenient way to rent Short Term capital is to rent it from the market. Players can see the annual cost of this form of capital on the main screen, on the capital management screen next to the “Amount, $” field and on the associated graph. Any desired positive amount of Short Term capital can be requested and obtained from the market. To do so, simply enter the amount you need on the Capital Management screen and press the “Confirm” button. Be careful while making a decision about the amount you need. Renting too little can lead to a very high portfolio default probability, which means that your portfolio’s default probability would exceed the “Doomsday” value, leading to your expulsion from the session. If that happens, you will not be able to continue playing until the subsequent session, if any.

Renting From Other Teams

The second method of acquiring Short Term Capital is to rent it from other participating teams. Please note that it is not possible to rent capital from an expelled team. Therefore, if a team has been expelled, its name will not appear in the list of available rental candidates.

This way of renting STC affords the renting team with a lower interest rate than the market rate. However, the amount of cash available for rent will be determined by the system before the beginning of the next round based on how much excess capital is then available to the lending team. Thus, the borrowing team cannot know beforehand the exact amount of capital that will be made available by the lending team. Nevertheless, this amount can be estimated by the lending team and communicated via Skype.

If you wish to rent from a certain team, simply indicate that fact in the column labeled “Rent” next to the selected team’s name. The lending team should state its intentions by selecting the “Lend” box corresponding to its partner-team name.

Before the following round, the system looks at renting requests and matches those that correspond. This means that a team’s renting mechanism will be executed if and only if Team A has chosen to “Rent” from Team B and Team B has chosen to “Lend” to Team A during the same round. If such a request is in place, the system will determine the amount of excess capital available to the lending team, if any, and transfer this amount of capital to the renting team’s account. The renting team will pay interest for the amount transferred at its allocated rate and the lending team will receive this payment, reducing its total capital expense.

Please note that both forms of capital rental can be used simultaneously. This means, that a team can place a request to rent from the market and at the same time, indicate its desire to trade with another team. The amount rented from the market will be allocated to the team regardless of its other activities.

Scale

Rating	Probability Of Default
Aaa	0.000050%
Aa1	0.000100%
Aa2	0.000250%
Aa3	0.000750%
A1	0.001000%
A2	0.002500%
A3	0.007500%
Baa1	0.500000%
Baa2	1.250000%
Baa3	2.750000%
Ba1	5.000000%
Ba2	7.500000%
Ba3	12.000000%
B1	17.500000%
B2	22.500000%
B3	30.000000%
Caa1	33.000000%
Caa2	47.000000%
Caa3	78.000000%
D	100.000000%

The “Scale” button acts as a source of additional information on how letter-grade ratings derived from the probability of default.

For example, in the table at right, you can see that a Baa2 rating, on average, corresponds to a 1.25% annualized portfolio default probability.

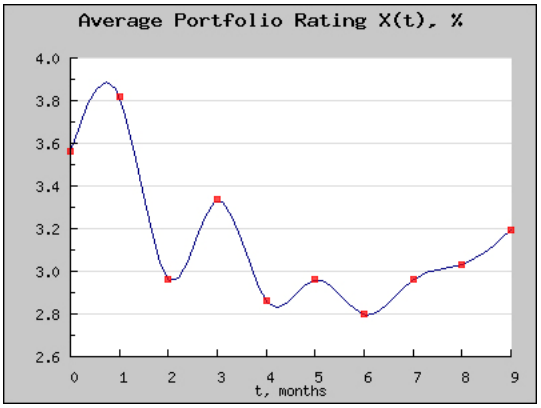
Actual default probabilities in the game are unlikely to be exactly the same as those in the table. In intermediate cases, the game uses the geometric average bracketing two letter-grade ratings to figure out which rating should be assigned to a particular exposure.

Normally, a participant will not use this table explicitly. Nevertheless, it helps to establish an intuitive feeling between letter-grades ratings and default probabilities.

Portfolio Progress

The “Portfolio Progress” button brings up a screen showing a time series of a team’s benchmarks. There are five graphs available on this screen. We now briefly discuss each one below.

Average Portfolio Rating X(t)



The “Average Portfolio Rating” represents the average default probability of all exposure in a team’s portfolio.

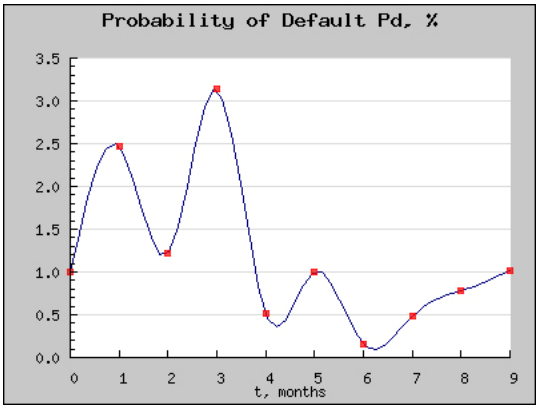
It helps to visualize how the portfolio evolves. Is it too volatile? Does Pd increase or decrease in time? Etc.

Knowing this information helps to estimate how much STC should be allocated to cover the team’s portfolio credit risk for the next round.

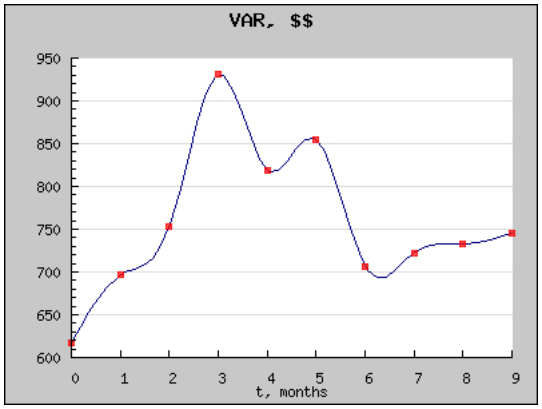
Probability of Default

This graph shows the evolution of the portfolio’s default probability given total available capital in each round. As you will recall, every team’s goal is to keep its portfolio default probability equal the set point (usually 1%) by renting capital, trading exposures, etc.

Therefore, this graph shows how efficient a team is able to manage credit risk. The more volatile this graph, the worse the team’s performance.



VaR



VaR shows the portfolio's "Value At Risk" metric as it evolves over time. This may be useful when making tactical decisions.

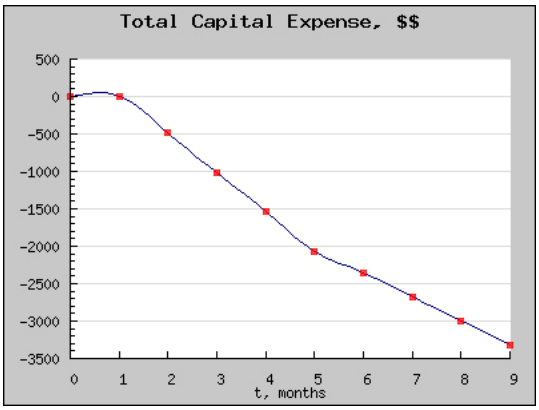
One of the main tasks of a risk manager is to keep enough cash to cover VaR at all times.

For example, on the graph at right, VaR at time step 9 was $750. If the playing team had a total capital in the amount of $750, it would be considered a very efficient team at managing credit risk.

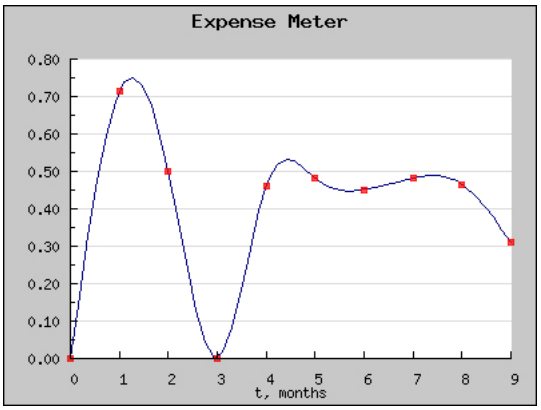
Total Cost of Capital

This graph shows the total dollar cost of managing credit risk. As you can see on the picture, Total Capital Expense can be negative, which means that team realizes a "credit profit" while managing its credit risk.

Profits can be realized in a several ways. As two obvious examples, we can mention:
a) Selling of CDS protection and collecting the premium and,
b) Lending excess capital to other teams and receiving interest income.



Expense Meter



To enable a quick comparison and an assessment of the game situation, a global "Expense Meter" is shown on the main screen. It shows the capital expense path only and a normalized numerical value of expenses.

Using this graph, players can evaluate their performance from one time step to the next, and potentially correct their strategies. Thus, the expense meter can be regarded as the main game benchmark.

Skype

The Skype button acts as a small communication center, providing the list of all playing teams and their Skype IDs.

Players will need to use Skype to make verbal capital trading agreements with each other.

The "Status" field shows whether a team is available to talk and, if pressed, automatically connects Skype to the corresponding team.

World Events

This is an informational screen displaying a log of all of all exposure upgrades, downgrades and defaults. Every entry shows the corresponding time step. All parts of this log have are shown to participants before every round. Therefore, the purpose of this screen is to provide players with additional historical information about World Events.

Time Step	Event
8	General Electric Company has been upgraded from Ba1 to Baa1.
8	Assurant Inc. has been downgraded from A3 to Baa3.
8	Wyeth has been upgraded from Baa1 to A1.
8	Apache Corporation has been downgraded from Ba1 to Ba2.
8	Southwest Airlines Co. has been upgraded from Baa2 to A2.
8	TransMontaigne Inc. has been downgraded from Baa2 to Ba1.
8	Xcel Energy Inc. has been upgraded from Ba2 to Baa2.
8	Motorola Inc. has been downgraded from Baa1 to Ba1.
8	Smurfit-Stone Container Corporation has been upgraded from B1 to Ba3.
8	JPMorgan Chase & Co. has been downgraded from Ba1 to B1.
8	CMS Energy Corporation has been upgraded from Baa3 to Baa1.
8	Praxair Inc. has been downgraded from Baa2 to Baa3.
7	Nucor Corporation has been downgraded from Ba1 to Ba3.
7	CVS Corporation has been upgraded from B1 to Ba2.
7	Nationwide Mutual Insurance Company has been downgraded from Baa3 to Ba3.
7	BellSouth Corporation has been upgraded from A2 to Aa3.
7	United Technologies Corporation has been downgraded from A2 to Baa1.
7	Jones Apparel Group Inc. has been upgraded from A2 to Aa2.
7	Emerson Electric Co. has been downgraded from Baa2 to Ba1.

World Events occur randomly. Nevertheless, there is logic behind this "randomness". Thus, it's very unlikely that an exposure rated AAA would ever default. However, in some rare cases an exposure rated AA will be made to default. This can happen in the "real world" and the game carries this possibility as well.

Last Actions

The "Last Actions" screen keeps track of actions taken by players in the course of the session. Every action has a corresponding time step. This information can be used to

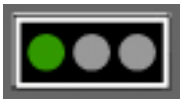
refresh your memory on which actions were taken previously and to see how they affected the current situation.

Among other things, participants can see how much capital they rented from the market, what CDS positions they entered to, which exposures where traded, etc.

Ready Button and Traffic Light

The last button on the main user screen is the “Ready” button. This button should be pressed when a team made all the decisions for current time step. Once pressed, there is no recourse. It’s very important not to forget to rent Short Term Capital (when it’s needed, of course) before pressing the “Ready” button. Therefore, the system checks if Short Term Capital was rented from the market. If it wasn’t, the system asks the player or team to confirm positively that not renting an STC was a conscious decision rather than a mistake.

On the right corner of the screen, players can see Traffic Lights. These are not control buttons, but simply provide information about the game’s current status.



A green light means that players can make their decisions. In this mode, all buttons and screens are available to participants.

After the “Ready” button is pressed, the light turns red, indicating that the system is waiting for all teams to be ready to start processing information. In this mode, all buttons are disabled and teams may not take any action.

When all teams are ready and all requests have been processed by the system, teams are presented with the information window previously shown, the one that shows upgrades, downgrades and defaulted exposures. At that time, the traffic light turns yellow. This informs players that, when the “Confirm” button on the information window is pressed, they will be able to start making decisions (the green mode) that will affect the subsequent round.

Basic Game Concepts

In this section of the manual we will cover the main basic game concept. Each of them will concentrate on managing risk using one of the game components. It is crucial to understand that these concepts taken alone will not lead to a good risk management strategy. However, they can be used as building blocks to create more sophisticated and robust strategy.

How the Scoring Works

First let's see how teams playing the game get scores. Team's score consists of two parts mentioned about in this manual: how close portfolio probability of default was at every time step; and what is total capital expense, in other words how much did it cost to manage risks.

These two components are equally weighted by default but game administrator can changes the weights letting one of these factors influence total score more then other.

Portfolio probability of default at each time step should be close to a predetermined level, normally 1%. The further default probability goes from this level, the worse team's performance, and therefore the lower score. There is no advantage of having portfolio default probability below this level. Moreover, it's absolutely equal in terms of scoring to have a portfolio with default probability of 2% and portfolio with default probability of 0%. In this case both portfolios are one percent far from desired level of 1%.

There is another predetermined level for default probability in the game called "Doomsday". Team will be expelled from the current session when "Doomsday" level reached. Expelled teams will be ranked lower then any other teams no matter what scores they got. If there is more then one team expelled from the session, the team which survived longer will receive a higher rank.

The Total Capital Expense is the second contributor to the final score. The lower price paid for managing risks, the higher score assigned to the team. Therefore, it's not a good strategy from the expense standpoint to buy protection on every exposure in the portfolio because premium paid for this protection will increase Capital Expense by a large amount. The balance should be found by player in managing portfolio default probability and paying as little as possible for doing so.

Each session will have independent rankings for playing teams. After all sessions played, system will compute final game score and rankings of the participating teams based on results of each session played. Never-expelled teams will obtain highest ranks based on their scores. After that, expelled teams will be ranked based on how long they survived before being expelled and the total score they had achieved by that time.

Managing Probability of Default

One of the main goals in the game is to keep portfolio default probability at each time step as close to the VaR target (1% by default) as possible. To achieve this, playing team should have sufficient capital to keep their portfolio's default probability close to the target at all times. This is not trivial task because exposures in portfolio change their default probabilities with time and consequently change portfolio characteristics.

This random nature of exposures makes close to impossible to predict exact amount of VaR at the next time step. However, estimation can be made based on current value of VaR and looking on historical data for the whole portfolio.

Short Term capital provides flexibility for participants at every time step to address their expectation concerning VaR on the next time step. Therefore, staying close to 1% should not be a big problem for a regular portfolio.

In some cases portfolio can behave in a very volatile manner. Usually it happens when several exposure in the portfolio have very low ratings (high probabilities of default). This can be fixed by trading these exposures for anti-correlated ones. As a result, a whole portfolio can become less sensitive to the World Events and therefore VaR will be much easier to estimate.

Total Capital Expense

The cost of managing risks accumulates on a special account named "Total Capital Expense. Every time capital is rented from the market or from the other team interest will be charge from this account, including both Short and Long Term capital.

In addition to that, when CDS protection purchased, premium will be paid from this account every month. Contrary, if protection was sold, realized premium will be transferred to this account, as well as when excess capital lent to another team, corresponding amount of interest will be transferred.

If exposure on which protection was bought defaults, payment will be made by a protection seller depending on amount of protection sold. This payment will decrease Total Capital Expense for the team. By analogy, if team had sold a protection on exposure which later defaulted, the protection amount will be added to the Total Expense account.

Trading Exposures

Trading exposure provides participant with very efficient and inexpensive tool for managing portfolio risk. Every month, each team will be given a set of anti-correlated to its portfolio exposures. Any exposure in team's portfolio except defaulted ones can be traded. Transaction costs will be added to the Total Expense account. They are very low comparing to the amounts of money invested in exposures, interest payments, and CDS premiums.

Once exposure from the given set was chosen to trade it will replace original exposure in team's portfolio. If original exposure had CDS protection associated with it the contract will be terminated and termination value will be added to the team's Total Capital Expense.

As mentioned above, trading will be very helpful in cases when there are some extremely risky exposures in the portfolio make task of estimating the VaR for the next time step impossible.

Besides that, team can set up some rules, like "Don't keep any exposure with default probability higher then 15% in the portfolio". Trading will become very helpful to enforce such a rule. Judicious and spare use of trading is what is intended.

Buying Protection – Risk Elimination

Alternatively to trading, team can buy or sell protection on any exposure in its portfolio. Buying protection in amount of LGD (loss given default) will result in total risk elimination for the particular exposure. For example, if LGD for a certain exposure is 55% then long CDS position of 55% will result in $0 expected loss. On the other hand, 100% long position in CDS will generate profits if the exposure defaults and this position is considered "bearish".

Every exposure has its own CDS spread which changes with time and depends on how risky the exposure is. Buying CDS protection will require pay monthly premium at the rate which was locked at the moment when contract was purchased. Therefore, after CDS protection was bought, buyer will not be affected by changes in CDS spread.

CDS contract can be terminated at any time by entering into the opposite contract (selling the same amount of protection which was bought). In addition to that, if an exposure has a CDS contract associated with it and team decides to trade it for one of the anti-correlated exposures, CDS contract will be automatically terminated. In both cases termination value will be computed as a result of the future cash flaws discounted to the present. This value can result in profit or loss which will be reflected on the Total Capital Expense Account.

Selling Protection – Taking More Risk to Reduce the Cost of Capital

Alternatively, a team can sell protection on any exposure in its portfolio. This will increase the amount of expected loss for the exposure but, on the other hand, will bring profits realized from collecting CDS premium. The amount of protection which can be sold is limited by the market. Thus, unlike buying protection, a participant can sell only a certain amount of protection. This amount specified on the exposure screen and changes with time.

The same termination rules apply to a short position in CDS contract. It can be terminated manually by taking a long CDS position for the same exposure, or trading the exposure.

In case if reference exposure defaults and team sold a CDS protection on it, corresponding amount of protection sold and LGD of this exposure will be transferred to the Total Capital Expense account. This amount usually will be significantly higher then regular interest payments or CDS premiums. Therefore, in case of such default, team will be in a very bad condition in terms of expenses. This will make most likely impossible to get high score in the game.

Renting Capital from Other Teams

When capital rented from other teams instead of the market there are several aspects to consider. First of all, the amount which will be rented is not known until the beginning of the next time step. As a result, it's hard to estimate the amount of capital rented. However, lending team can give a rough estimation as to this amount looking at the current state of its portfolio. In this situation using Skype can become handy to negotiate with other teams about how much they will be able to lend at the beginning of next month.

System will determine automatically how much of the capital can be lent. It will compute the excess amount of the lending team and transfer it to the Short Term Capital account of the renting team.

It's possible that that lending team will not have any excess capital. In this case zero amount of capital will be transferred to the renting team and this team most likely will have real problems managing its portfolio's default probability.

After all, renting capital from other teams provides a cheapest source of capital in the game. However, it also involves risks that lending team will not be able to provide any capital, or will have too much capital to lend. Therefore, communicating with other teams is crucial to find the balance between needs and abilities of renting and lending teams.